

Future of NGM and Model Output Statistics (MOS) - April 1999

STATUS: At the April 1999 meeting of the NWS Committee on Analysis and Forecast Techniques Implementation (CAFTI), the committee recommended that the Environmental Modeling Center of NCEP convert the NGM to run on the new Class VIII (IBM SP) computer. In addition, CAFTI recommended that the Techniques Development Laboratory (TDL) also modify production software so as to generate the NGM MOS on the Class VIII machine. These efforts will begin shortly. The goal is to meet NWS and external user requests for a 1-year overlap between the NGM MOS and the new AVN MOS guidance and to produce the MOS guidance in a timely manner. The NWS anticipates that a partial AVN MOS package will be available by November 1999 and that a full package will be available by April 2000. Thus, the NGM and NGM MOS guidance should be available until approximately April 2001.

CHANGES IN THE NGM: Because NCEP can not expend a large amount of resources on converting the old NGM code to the IBM SP, the NGM will be modified to run on a single node of the IBM SP. Because of scheduling considerations, NCEP also must revise the NGM configuration so that the NGM initial conditions come from the Eta model analysis. The lateral boundary conditions will be provided by the previous AVN forecast cycle. Thus, the 1800 UTC AVN run will provide one-way nested conditions for the subsequent 0000 UTC NGM run; similarly, the 0600 UTC AVN run will provide boundary conditions for the subsequent 1200 UTC NGM run. NCEP plans to test this configuration during the summer of 1999 to ensure that there is no degradation in model performance; TDL will also run tests of the NGM MOS guidance at the same time. Although no degradation is expected, NCEP will revise and optimize all components of the existing legacy NGM system to run on multiple IBM SP nodes if unacceptable degradation is found. However, if no degradation in forecast skill is found, the current NGM initial analysis and nesting properties will be eliminated.

NEW MOS GUIDANCE: Development of a new AVN MOS package is underway for temperature, dew point, ceiling height, cloud amount, wind direction and speed, probability of thunderstorms and severe weather, precipitation type, probability of precipitation, and probability of precipitation amount. Current plans are to develop AVN MOS guidance from both the 0000 and 1200 UTC runs of the model. As noted previously, a partial AVN MOS guidance package will be implemented by November 1999, and a complete guidance package will be implemented by April 2000. The initial AVN MOS guidance will be analogous to the current NGM MOS guidance in terms of weather elements and forecast intervals with many of the forecasts being valid at 3-h intervals. AVN MOS guidance will, however, be for projections out to 72 hours after 0000 or 1200 UTC and will be generated for over 1000 stations in the contiguous U.S., Alaska, Hawaii, and Puerto Rico. Plans are to add more forecast sites, weather elements, projections, and both 0600 and 1800 UTC cycle guidance in later implementations.

There are no plans currently to begin parallel development of a complete package of Eta-based MOS. Work is underway, however, to develop an Eta-based MOS system for predicting thunderstorms and severe weather. This Eta MOS system will complement an Eta-based

trajectory model which is under development.

The MRF-based MOS package will also be revised substantially during the next 18 months. Development of new maximum/minimum temperature, probability of precipitation, and probability of precipitation amount equations for projections out to 192 hours after 0000 UTC are underway for the same stations included in the short-range package. Forecasts of other elements will be added, and the definitions of the wind, cloud, and snow predictands will be modified in accordance with NWS and external user requirements.

The traditional MOS technique has not been altered in doing these developments. Because of changes to the AVN and Eta models during the collection of the developmental sample, TDL has taken a conservative approach in deriving the MOS equations. A standard grid is being used to collect and process the model variables, all model predictors are smoothed over an area, and the model predictors are generally standard meteorological variables. At this time, the developmental samples consist of all the AVN (or Eta) model data currently available. Extensive testing is being done to determine the skill of the guidance compared to either the NGM MOS guidance, the older MRF MOS guidance, or the direct model output.

TIMELINESS CONCERNS ABOUT THE AVN MOS GUIDANCE: The current operational schedule for the AVN model means that the AVN MOS guidance from the 0000 and 1200 UTC cycles will not get to NWS forecasters in the Eastern time zone early enough to be used in the public and aviation forecasts. This is unacceptable since the current NGM MOS guidance package arrives in a timely manner. NWS personnel are currently considering possible options to eliminate this problem, including the initiation of the AVN from an earlier data dump, production of AVN MOS from the 0600 and 1800 UTC cycles during the first phase of AVN MOS implementation, and accelerated development of an Eta MOS package. Resolution of this issue will possibly affect some of the MOS development plans listed above.

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Web Sites:

Status of NGM conversion -- http://sgi62.wwb.noaa.gov:8080/ngm_status.html

Station listing for AVN MOS -- <http://www.nws.noaa.gov/om/tpb/mostable.htm>

Status of AVN MOS development -- <http://www.nws.noaa.gov/tdl/> (This web site currently describes most of TDL's ongoing work; information on the AVN MOS development is not yet available, but will be shortly.)